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Lake Freight Matters.

The fact that two of the largest corporations connected with the iron ore industry of the lakes have, within the past few days, voluntarily increased the wages of their employes 10 per cent., is a forcible indication of the return of confidence that is now looked for in all lines of trade. The Minnesota Iron Company is the largest corporation producing ore in the Lake Superior iron region and the Carnegie company is the largest consumer of Lake Superior ores. These corporations are, in fact, the largest of their kind in the whole country, and the influence of this recent action on their part in the matter of wages will not be confined to the iron industry alone. It will tend to restore confidence in other branches of trade, as the iron industry is looked upon as the barometer in manufacturing lines. Liberal orders for steel rails and cars have been given out by some of the railroads, and the attitude of these corporations as buyers is encouraging.

There has been just enough grain moving out of Chicago and Duluth since the opening of navigation to about make up for the delay in moving

Leslie, the St. Lawrence river wrecker, has steel pontoons that would probably be better suited to raising this boat than any other pontoons owned on the lakes. One great difficulty in the work will be encountered in getting out the cargo, as the Cayuga has steel decks, the upper deck being covered with wood. Wreckers who have been accustomed to cutting out the decks of wooden boats would find such work very trying in a steel boat.

The 1895 directory for the Ship Masters' Association appears this week. It contains the usual list of names of members, a port directory, four handsome illustrations and considerable valuable information. In order that each member may be supplied with the directory, a copy of it, enclosed in an envelope, has been sent according to the lodge to which he belongs, in care of these addresses: Buffalo lodge No. 1, Capt. Alex Clark, 60 Main street; Port Huron lodge No. 2, Kendall Marine Reporting Co.; Chicago lodge No. 3, F. B. Higbie, 1 Franklin street; Cleveland lodge No. 4, W. A. Collier, Main street bridge; Bay City lodge



VESSEL OWNER'S HOPE OF RELEASE FROM THE CLUTCHES OF THE BUFFALO HARD COAL OCTOPUS.

coal, and the demand for vessels to carry ore has been sufficient to cause an advance of 5 cents in the wild rates from Escanaba and Marquette, so that the figures now are 75 cents from ports at the head of Lake Superior, 65 cents from Marquette and 45 cents from Escanaba.

Prospects of a Great Wrecking Job.

The best methods known to wrecking companies will undoubtedly be adopted in the efforts that will be made to raise the Lehigh Valley steamer Cayuga, sunk in collision near the Straits of Mackinaw a few days ago. Although the boat has not as yet been found, and there is some question as to the depth of the water in which she is sunk, it is quite probable that an effort will be made to raise her, even from a depth of 100 feet or more. The Cayuga is one of the strongest steel steamers ever built on the lakes. She is the first steel boat to go down in a depth of water that will make wrecking operations extremely difficult. Several steel boats have, of course, been sunk at points in open lake where there was no possibility of recovery, but this is not the case with the Cayuga,

No. 5, Saginaw Bay Towing Association, B. Boutell; Milwaukee lodge No. 6, Milwaukee Tug Boat Line; Detroit lodge No. 7, J. W. Westcott, foot of Woodward avenue; Marine City lodge No. 8, Capt. W. H. Scott; Toledo lodge No. 9, E. G. Ashley, 36 Summit street.

Although there are enrolled on the books of the Lake Carriers' Association thus far this season vessels aggregating about 550,000 registered tons, the total is not what it should be, in view of the efforts made by the organization for the welfare of vessel owners generally. There is still 100,000 tons or more represented by vessels that secure advantages of the association in legislation and in various other undertakings, without contributing to the cost of such work. President Livingstone, Mr. Keep, Capt. McKay and other officers of the association are now trying to list this tonnage on their books, and they should be assisted by owners in all parts of the lakes.

Experiments now being conducted by ore-carrying companies may result in trimming being almost entirely done away with.

Mr. Reese on Basic Open Hearth Steel.

In connection with the large number of opinions recently printed in these columns, as to the relative value of basic and acid open hearth steel for structural purposes, a communication from Mr. Jacob Reese of Philadelphia, published in the last issue of the Iron Trade Review, is of special interest. Mr. Reese first refers to the process of manufacture.

"The basic process" he says is so called because it is conducted in a basic-lined vessel, and in the presence of a basic slag, while the Bessemer process is conducted in an acid-lined vessel, and in the presence of an acid slag. Basic material is the oxide of metals; acid material is the oxide of metalloids. In the practice of the Bessemer process, the vessel is lined with ganister, a kind of sand rock. This old Bessemer process requires pig iron high in silicon to develop heat while burning it out in the converter. In converting the metal into steel, this silicon is changed to silica. The steel so made always contains all the phosphorus contained in the pig iron, fuel and fluxes from which it was made, and a considerable quantity of silicon and other impurities. In the practice of the basic process, ganister lining is not used, but lime, magnesite, chrome ore, or other basic material is employed. For the production of basic steel the blast furnace is worked in such a manner as to produce pig iron low in silicon, and by this means we avoid making the dirty slag in the converter, that the acid process does in burning out a large amount of silicon. In order to secure the required heat in the basic converter, we make the pig iron high in phosphorus, and by burning the phosphorus into phosphoric acid, we develop sufficient heat. Thus, by working the metal in a vessel having a pure lining and a pure basic slag, a purer and consequently a softer and more ductile steel is produced than can possibly be made by the Bessemer, or by any other process where a silicious slag is produced and maintained.

The basic process may be practiced in different ways. When practiced in a basic-lined Bessemer converter it is called the basic Bessemer process, and requires a metal containing not less than 2 per cent. of phosphorus, and less than 2 per cent. of silicon; preferably 3 per cent. of phosphorus, and less than one-half of 1 per cent. of silicon. The time required in making a heat is 20 minutes. When the basic process is conducted in a basic-lined open hearth, it is called the basic open hearth process, and may be practiced on metal containing phosphorus in all degrees, and silicon in all degrees; preferably with phosphorus from .2 to .3 per cent., and silicon below 0.50 per cent. The steel produced by the basic open hearth requires from five to twelve hours to heat. The basic duplex process, consists in blowing molten metal with an air-blast, while held in an acid-lined converter until the silicon is eliminated, and the carbon is reduced to about one-half of one per cent., then transferring the desiliconized metal (minus the slag) into a basic-lined open hearth, and there boiling out the carbon and dephosphorizing the metal in the presence of a basic slag. This process will work metal of any and every quality.

Following this explanation of the methods of manufacture, Mr. Reese says: "The basic Bessemer process has been in use at Pottstown, Pa., for about two years, and has produced a pure soft steel from phosphoric ores, which has been highly esteemed and sold as fast as made. The phosphorus which we have taken out of the steel has been put into lime and sold as a phosphate of lime for fertilizing the land. In addition to the large amount of this basic slag phosphate which we have sold to the farmers of the United States and Canada, I have exported over 18,000 tons to Europe, the most of which has gone to Stettin and Danzig, Germany. It is the cleanest, purest, most vigorous and the cheapest plant food in the market.

The basic open hearth is now largely in use in the United States. It is found to be the cheapest and best method of converting scrap into steel now known. The steel made by the basic open hearth is soft, clean, homogeneous and tough, and is largely used for tin plate; indeed the high reputation already acquired by the American tin plate is largely due to the pure basic open hearth material from which it is made.

As is well known, after a critical contest I was adjudged to be the prior inventor of the basic process, consequently the Thomas patents issued to him in the United States or any other country, have no standing in the United States courts. My basic patents cover every practical feature of the basic process, whether it is practiced in the converter, the open hearth, or any other kind of vessel. They cover the use of lime, magnesian lime, dolomite, magnesite, magnesia, carbon, chrome, or manganese ore, or any other basic oxide as a lining or as a purifying slag.

"The great discovery of low phosphorus ore in the Lake Superior region, and the low price at which it can be mined and put on the market has given a great advantage to the Bessemer acid process and kept the basic Bessemer back, but even that has not been sufficient to suppress the basic open hearth, which is now threatening to drive the acid open hearth out of use in this country. The basic process is fully covered by letters patent, which are owned by the Steel Patents Co., of Philadelphia, while the patents covering the manufacture and use of the resulting phosphate are still owned and controlled by me. The most important basic patents

will not expire until 1910, and I advise all parties who are interested in the practice of the basic open hearth to take out a license and save legal cost. In the Lake Superior iron ore mines the phosphorus varies, the output of some of the mines running 40 per cent. non-Bessemer and 60 per cent. Bessemer, while in other mines the per cent. of Bessemer runs from 50 down to nothing; hence in mining Bessemer, from 30 to 80 per cent. of non-Bessemer must be mined, and as the demand for non-Bessemer is low, the mines are crowded and the docks are loaded with it, and the fact is now plain that to secure the Bessemer, the non-Bessemer must be stocked and re-handled when a market offers. This must add to the cost of Bessemer ore, and will cause an advance, which will bring the basic Bessemer into economic use. What shall be done with the non-Bessemer Lake Superior ores? Why, I believe that they can be worked in the basic duplex process to advantage, and can be made into better and cheaper steel than is now made by the acid process, and I would like to confer with parties who are interested in cultivating a market for iron ores of that class."

New Buoys in Hay Lake Channel.

Commander W. W. Mead, inspector of the eleventh light-house district, which includes Hay lake channel, sends a communication to Secretary Keep of the Lake Carriers' Association expressing the opinion that masters have been running the channel without a full knowledge of its currents, and that they have also been trying to make the passage when it was too dark to see the buoys. He says:

"Having recently visited Sault Ste. Marie and inspected the buoyage of Hay Lake, I found the buoys all in position and the channel fully marked, with the exception of those points at which it is proposed to place lights, and directions were given to place buoys temporarily in these positions. The buoys so placed are as follows: First, black spar buoy opposite red buoy No. 10, lower or south-east end of dike; second, red spar buoy at turn in Middle Neebish, between buoys Nos. 18 and 20; third, black spar buoy at turn in Middle Neebish, between buoys Nos. 17 and 19; fourth, red spar buoy south of nine-mile point to mark sunken crib; fifth, red spar buoy north of Six Mile Point; sixth, black can buoy at northern entrance to the new channel, to be left on starboard hand, close to, coming down.

"I am thoroughly convinced that the damage done so far this season has been caused by the insufficient knowledge of masters of vessels with the strong currents which sweep the new channel at several points, notably at the northern entrance, and at turns into Middle Neebish; also to the fact that the attempt to run was made when it was too dark to see the buoys. While a can buoy may be seen a little further than a spar buoy, it is not safe to run through unless it is light enough to see quite a distance, as it is necessary to commence turning at some distance from the buoy, in order to avoid being swept on to the dangerous shoal on the eastern side of the channel, and it will be necessary for vessels bound down the river to pass quite close to this can buoy. I do not wish to assume to make suggestions, but it is my earnest belief that vessel owners would save much time and money by obliging their captains to employ local pilots through the new channel, until they become thoroughly acquainted with the currents and other dangers. I will always be glad to give you any information within my power."

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on May 11, 1895:

	Wheat, bushels.	Corn, bushels.
Chicago	21,051,000	3,329,000
Duluth	11,014,000
Milwaukee.....	545,000
Detroit.....	468,000	154,000
Toledo	617,000	343,000
Buffalo	1,398,000	928,000
Total.....	35,093,000	4,754,000

Recent trials of the Minneapolis, while attached to Commodore Meade's squadron, show that she is a wonderful vessel, even under extreme conditions of service. Her run in the tropics for forty-eight hours part of it with natural draft, proved her the most efficient ship yet built for the navy, and as a result her contractors will get the reserve sum held by the government pending her complete acceptance. Without effort the Minneapolis maintained a speed within a small fraction of 20 knots without using blowers, which in the tropics is unprecedented.

LISTS OF MASTERS AND ENGINEERS OF LAKE VESSELS, TOGETHER WITH NAMES AND ADDRESSES OF MORE THAN A HUNDRED FIRMS AND CORPORATIONS CONTROLLING LINES OF FREIGHT AND PASSENGER STEAMERS ON THE LAKES, MAY BE HAD IN PAMPHLET FORM FROM THE MARINE REVIEW, NO. 516 PERRY-PAYNE BUILDING, CLEVELAND, FOR 25 CENTS.

Less than a Mill Per Ton Per Mile.

The clerical force at the St. Mary's Falls canal prepared again during the past winter the discussion of the canal traffic known as the mile-ton report. The cost per mile per ton of moving freight that passed through the canal in 1894 was $\frac{29}{100}$ mills; in 1893 it was $1\frac{1}{10}$ mills.

It is learned from the report that the greatest number of miles run during the season is again to the credit of the steamer Matoa, of the Minnesota line, Cleveland, and amounted to 48,663 miles. This boat earned the same credit last season. The greatest amount of freight carried during the season is to the credit of the steamer Maritana, of the same line, aggregating 94,640 net tons, and the greatest number of mile-tons for the season is to the credit of the same boat, and is 77,985,016. The largest single cargo carried during the season is to the credit of the steamer S. S. Curry, owned by the Hawgood & Avery Transit Co., Cleveland, and amounted to 3,758 net tons. The largest single cargo carried by a sail vessel is to the credit of the tow barge Sagamore, owned by the Huron Barge Co., Cleveland, and amounted to 3,286 net tons. This barge earned the same credit during the season previous.

From the column of largest cargoes it is ascertained that there were ninety-one steamers that carried in their largest load 2,000 tons and upwards. That these ninety-one cargoes aggregated 206,531 tons and averaged 2,269 tons. There were fifty-seven steamers that carried in their largest load 2,500 tons and upwards, aggregating 152,787 tons and averaging 2,680 tons, and ten steamers that carried in their largest load 3,000 tons and upwards, aggregating 33,075 tons and averaging 3,307 tons. There were seven steamers that carried in their largest load 3,500 tons and upwards, aggregating 25,364 and averaging 3,623 tons. There were twenty-five sail vessels that carried 2,000 tons and upwards, aggregating 54,745 tons and averaging 2,190 tons; nineteen sail vessels that carried 2,500 tons and upwards, aggregating 55,696 tons and averaging 2,931 tons, and one sail vessel that carried 3,000 tons and upwards.

MILE-TONS SEASON OF 1894—COST OF CARRYING FREIGHT TRANSPORTED THROUGH ST. MARY'S FALLS CANAL.

ITEMS.	Units.	Quantity.	Price per unit.	Amount.
Coal.....	Net tons.	2,787,184	\$.40	\$1,118,873 60
Flour.....	Barrels.	8,965,773	14	1,255,208 22
Wheat.....	Bushels.	34,869,483	02 $\frac{1}{2}$	871,737 07
Grain, other than wheat.....	Bushels.	1,545,008	02 $\frac{3}{4}$	42,487 72
Manufactured iron.....	Net tons.	36,107	90	32,496 30
Pig iron.....	Net tons.	24,552	15	28,234 80
Salt.....	Barrels.	237,461	12	28,495 32
Copper.....	Net tons.	99,573	1 95	194,167 35
Iron ore.....	Net tons.	6,548,876	70	4,584,213 20
Lumber.....	M. Ft. B. M.	722,788	1 90	1,373,297 20
Silver ore and bullion.....	Net tons.	412	2 25	927 00
Building stone.....	Net tons.	21,417	1 28	27,413 76
Miscellaneous mdse.....	Net tons.	451,185	2 75	1,240,758 75

In all cases tons are net tons, or tons of 2,000 pounds. The total amount of freight paid, \$10,798,310.29, which divided by the total mile-tons, 10,927,871,324, gives the cost per mile per ton as $\frac{29}{100}$ mills. The average distance freight was carried was $828\frac{1}{10}$ miles, which is $3\frac{8}{10}$ miles less than in 1893. The nature of the data from which the preceding result was found is such that it includes the cost of loading and unloading. Other results obtained were as follows:

Total mile tons.....	10,927,871,324
Total freight paid.....	\$10,798,310.29
Cost per mile per ton.....	99-100 mills
Average distance freight was carried.....	828 1-10 miles
Average cost per ton for carrying freight.....	81 4-5 cents

A summary of craft using the canal during the season follows:

Total number of registered craft.....	814
Total passages by unregistered craft.....	172
Total freight carried by registered craft.....	13,177,612
Total freight carried by unregistered craft.....	18,248
Total passengers.....	27,236
Total valuation of craft registered.....	\$43,084,000

The Canadian freight amounted to 460,684 tons, which is $3\frac{1}{2}$ per cent. of the total freight for the season. The total passages for the season amounted to 14,491, and 2,011 of these were by seventy-six crafts under 100 tons register. Their aggregate registered tonnage was 1,976 tons and their average tonnage 26 tons. The freight carried by these crafts during the season only amounted to 83 tons.

The canal was open to navigation during the season of 1894, 234 days, which is an increase of 15 days in comparison with 1893. The freight carried during the season of 1894 amounted to 13,195,860 net tons, which is an increase of 2,399,288 net tons in comparison with the season of 1893, or an increase of 22 per cent.

The following table shows freight rates for water transportation to

and from Lake Superior for five years past, upon which this discussion is based:

Items.	1890.	1891.	1892.	1893.	1894.
Coal, net tons.....	\$ 45	\$ 43	\$ 41	\$ 40	\$ 40
Flour, bbls.....	13	15	16 $\frac{1}{2}$	17	14
Wheat, bu.....	03	04 $\frac{5}{10}$	03 $\frac{5}{10}$	02 $\frac{8}{10}$	02 $\frac{1}{2}$
Grain, bu.....	02	03 $\frac{1}{2}$	03 $\frac{3}{4}$	02 $\frac{3}{4}$	02 $\frac{3}{4}$
Corn, bu.....	03	03 $\frac{1}{2}$	03 $\frac{3}{4}$	02 $\frac{3}{4}$	02 $\frac{9}{10}$
Manufactured iron, net tons.....	1 34	2 50	2 15	2 00	90
Pig iron, net tons.....	1 35	1 17	1 23	1 30	1 15
Salt, bbls.....	15	18	15	12	12
Copper, net tons.....	2 38	2 00	1 40	1 75	1 95
Iron ore, net tons.....	1 10	98	1 00	80	70
Lumber, M. ft., B. M.....	2 38	2 70	2 95	2 35	1 90
Silver ore, net tons.....	2 25	2 25	2 25	2 25	2 25
Building stone, net tons.....	2 00	2 00	1 67	1 36	1 28
Unclassified freight, net tons.....	2 75	3 58	3 60	3 00	2 75

It is found by the discussion of the reports of the watchmen, stationed at the head and foot of the canal, that vessels were delayed at the canal during the season 53,349 hours and 10 minutes, an average of 4 hours and 8 minutes. These records also show that the railroad swing bridge was detained by boats 45 minutes. There does not appear to be a single instance where boats were detained by the railroad swing bridge.

Bells on Lake Vessels.

After a great deal of delay, that would seem entirely unnecessary, the treasury department has finally fixed upon weights of bells to be carried by lake vessels in accordance with the provision of the White law that is now being enforced. As indicated by the following letter, all vessels above 30 gross tons must carry bells weighing not less than 60 pounds, but in passing upon these bells the steamboat inspection service has decided that the matter of quality shall be left entirely to local inspectors:

To United States Local Inspectors of Steam Vessels: Complaints having reached the department from persons owning small steamers in the eighth supervising district, that the local inspectors, in construing the requirements of rule 14 of the act of congress approved Feb. 8, 1895, in the matter of requiring steamers to be furnished with efficient bells to be rung when at anchor in fog or thick weather, are requiring the smallest class of steam vessels to be furnished with bells weighing sixty to sixty-five pounds, thus evidently making no discrimination in respect to the size of bells required for larger and smaller classes of steamers. In the opinion of the department this is clearly a hardship to the smaller class of vessels, and, in many cases, no doubt, impracticable; and in compliance with instructions from the department, you are hereby instructed that vessels of ten gross tons and under if furnished with a bell 6 inches in diameter to be rung by hand, will comply with the requirements of the law. On vessels upward of 10 gross tons and not exceeding 30 tons gross, the bell supplied should weigh at least thirty pounds. Steamers above thirty gross tons should be furnished with bells weighing not less than sixty pounds. All bells should be of good tone and quality, such as you shall deem, in your discretion, suitable for the purpose for which bells are intended.

M. J. GALVIN,

Supervising Inspector,

Ninth District.

In deciding that the matter of quality shall be left entirely to the local inspectors, there has evidently been a disposition on the part of both supervising inspectors and Gen. Dumont, the chief of the service, to avoid responsibility, as shown by the following extract from a letter recently written by Gen. Dumont to a firm manufacturing bells:

"I have informed the supervising inspector at Detroit that, as I read the law, in the matter of bells on lake steamers, recently enacted, neither he nor myself has anything to do with selecting bells, that being a matter left to the discretion of the subordinate inspectors. The law referred to specifically provides, first, for an 'efficient bell'; second, that it is 'made the duty of the United States local inspectors of steam vessels, when inspecting the same, to require each steamer to be furnished with such bell.' In view of the specific directions to the local inspectors, as above quoted, I have advised Supervising Inspector Galwey to inform the local boards of inspectors in his district, namely, at Detroit, Chicago, Milwaukee, Grand Haven, Port Huron and Marquette, of the law on the subject, and that the local inspectors must take all the responsibility of selecting 'efficient bells' when they inspect the different steamers in their districts. I have also referred a copy of my letter to the supervising inspector at Buffalo, N. Y., for his information."

In taking the stand that local inspectors shall judge as to the quality of bells, Gen. Dumont falls back on a strict reading of the law. As a result some local inspectors will pass all kinds of cheap bells, while others will insist upon bells made of good quality bell metal and will not pass cast-iron bells or bells of inferior quality. This difference will be unsatisfactory to manufacturers, sales agencies, purchasers and everybody concerned. It would seem that the head of the service in Washington should give attention to the subject of quality in these bells, and give out instructions to local inspectors that would prevent a certain quality of bell being accepted in one district and rejected in another.

Some Convincing Comparisons.

Assistant United States Engineer L. C. Sabin, who is employed with members of the army engineer corps on the lakes, has been working up some interesting comparisons, all based on the traffic of St. Mary's Falls canal.

In 1892 there were 1,168,849 freight cars on the railways of the United States. Every car would be required to carry more than ten tons of freight in order to carry the amount passing the canal in 1894.

The amount of coal passing the canal in 1893 was more than all the coal exported from the United States in that year.

The lumber passing in 1893 was nearly equal to the lumber of domestic production exported.

The wheat produced in the United States in 1892 was 515,949,000 bushels. The amount consumed in the United States during the fiscal year ending June 30, 1893, was 324,421,740 bushels, and the amount of domestic wheat exported was 119,912,633 bushels. Thus the wheat (including flour) passing the canal in 1893 was 12 per cent. of the production, 20 per cent. of the consumption, and 56 per cent. of the exportation. Or, in other words, the wheat passing the canal in that year was sufficient to supply bread to all the people in the United States for about two and a half months.

Passing to the estimated value of the freight in 1893, it was in excess of the estimated value of the state of Vermont, including real estate and improvements; more than one and three-quarter times the total expenditure of the post office department of the government; more than 90 per cent. of the value of the world's production of gold, or of the total value of exports of domestic manufactures from the United States, or of the amount expended for public schools in the United States, or of the amount paid in pensions in that year. If to the value of the freight were added the value of the craft engaged in the transportation, any of the above mentioned items would be far outstripped.

The total tonnage of the sailing and steam vessels of the merchant marine of the United States in 1893 was 4,825,071, or less than one-half of the freight tonnage passing St. Mary's Falls canal in that "off" year.

The St. Mary's freight in 1894 was equal to the total foreign tonnage entered at all the ports of the United States from foreign countries in 1893.

The total tonnage entered from and cleared for foreign countries at the customs district of New York for the fiscal year ending June 30, 1893, was 7,015,030, and the number of vessels was 5,037. Comparing these with the similar quantities for St. Mary's Falls canal we see that the latter passed 30 per cent. more freight and more than twice as many boats.

Mr. Sabin also presents the following table showing comparative lake and railway freight rates from 1887 to 1893, inclusive, as determined from a discussion of the traffic passing St. Mary's Falls canal:

SHOWING COMPARATIVE LAKE AND RAILWAY FREIGHT RATES FROM 1887 TO 1893, INCLUSIVE, AS DETERMINED FROM DISCUSSION OF TRAFFIC PASSING ST. MARY'S FALLS CANAL.

YEAR.	Freight charges—Mills per ton mile.		Freight charges on wheat—Mills per ton mile.	
	By rail on eighteen trunk lines.	By water to and from Lake Superior.	By rail Chicago to New York.	By water Duluth to Buffalo.
1887.....	9.7	2.3
1888.....	9.2	1.5	4.8	1.4
1889.....	9.2	1.5	5.0	1.5
1890.....	8.8	1.3	4.8	1.1
1891.....	8.7	1.35	5.0	1.7
1892.....	8.0	1.31	4.7	1.3
1893.....	...	1.10	4.9	1.0
1894.....	...	0.99	...	0.9

Fog Signals.

Major W. R. Livermore, one of the officers of the light-house service who has been entrusted with investigations regarding fog signals, has of late added some of the results of his investigations to the literature of the service. The lights of light-houses in clear weather, he says, are obscured only by the curvature of the earth, but in fogs, since even the sun is hidden, they become invisible. Sound, however, travels well under some conditions of storm, and a century or two ago the use of bells was begun as a warning in times when the light could not be seen. At Boston light a cannon was once used as a signal, and many other devices have been invented to warn mariners as they approach the shore. The United States is the only nation in the world which makes an attempt to line its entire shores with signals, the theory here being to place such signals sufficiently close to permit of shore navigation in any weather; but practically the system is not quite complete. In 1851 the transmission of signals through the air was investigated by Gen. Duane; afterward it was

taken up by Henry and continued by him with more or less activity up to the time of his death.

Major Livermore's investigations for the light-house service of late have had to do with the efficiency of fog signals, their expense, details of their construction and position, the reflections and the refractions of the sound rays, and the effect of obstacles near to and distant from the source of the sound. The signals which are in common use are the siren, devised in 1870 by Brown, which can be heard ten or twelve miles; whistles, which will carry eight or ten miles; trumpets, with a range of six miles; and bells, which can be heard not more than three-quarters of a mile. In addition, there are floating bells, which can be heard not more than three-quarters of a mile. In addition, there are floating bells, which can be heard for slight distances only, and whistling buoys, which are nearly as powerful as the trumpet. The sirens can be heard for long distances, but they are very expensive. On the other hand, bells are not costly to operate, but they are audible for short distances only. A portion of the experiments dealt with larger bells and with the giving of the present bells a harder stroke with the hammer, both of which give the bell signals a higher efficiency. With reference to the transmission of the signals through the air, previous experiments or comparisons have been uneven. For example, no trumpet has ever been constructed large enough to be properly compared with the siren.

A steamer of the light house service was fitted for the experiments, and observations in all kinds of weather and under differing conditions were secured. With reference to obstacles, it was found that intervening obstacles tend to diminish the intensity of the sound, irregular surfaces near and in front of the signals effectively lessen their efficiency, obstacles behind the signal cut off the sound in that direction, and obstacles at a distance from the signals cut off the sound in their immediate shadows. As to the effect of weather conditions, these facts appear: Rain and snow do not of themselves modify the transmission of sound, but in affecting the temperature of the atmosphere they do influence the refraction of the sound and may, indeed, under certain conditions, cause it to be lost to objects on the surface of the water. This is a most important discovery, for it accounts beautifully for the so-called "ghosts," which are areas within which no sound from the signals can be heard. These silent areas have been accounted for in different ways, Tyndall having given a "flocculent material" solution, which, while within the limits of laboratory experiment, seems hardly possible on so large a scale as it must be in nature. Major Livermore finds that under certain conditions of wind relative to the position of the signal, the sound rays become refracted upward in certain places, reaching the surface of the water at more distant points in precisely the same line.

A curious example of this was once observed in experimenting near Boston light. At a distance of about a mile from the light, no sound whatever was heard from the signals at the light, and it was thought that they had been stopped. Suddenly, however, they were heard in full intensity, and the steamer was stopped and backed again into the silent area. A man was sent up the mast, and he reported that he could hear the signals, although no sound could be heard on deck. This experiment was repeated several times, and a position was found where the noises could be heard at the bow of the steamer but not at the stern. The signals employed on this occasion included a bell, a fog horn, a whistle and a gun; and although the smoke of the gun and the steam of the whistle could be seen from the steamer, no sound reached its deck while in the silent area. The sound rays, refracted through the conditions of the atmosphere, formed an arch over the silent area.

As the outcome of these experiments and investigations, there are many matters of interest and importance. Scientifically, the explanation of the atmospheric conditions which cause the silent area and the underlying principles of refraction of sound rays are of great importance; while, practically, there are many matters closely related thereto. The location for signals so that their efficiency may be to seaward, and not, as now, oftentimes to landward, the placing of them so that the silent area may be overcome, and other matters of this nature, are of the greatest practical advantage.

The Sylvania, a twin-screw cargo steamer with 6,500 tons capacity, is the latest addition to the Cunard line. She is to be used in the cargo and cattle trade between New York and Liverpool, and is 460 feet over all, 49 feet beam and 42½ feet deep. The ventilation and lighting comprise the latest developments in these lines. On trial, a speed of 15½ knots, over 18 miles an hour, was attained. Two large double-ended boilers, fitted with Howden's system of hot draft, furnish steam to the triple expansion engines, which have cylinders 22½, 36½ and 60 inches diameter, by 48 inches stroke.

COPIES OF THE LATEST CHARTS OF GEORGIAN BAY HARBORS MAY BE HAD FROM THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING.

Rear Admiral Richard W. Meade—A Fighter.

Newspaper dispatches from Washington during the past few days indicate that interest has been at fever heat in navy circles as a result of the detachment of Rear Admiral Meade from command of the north Atlantic squadron. Numerous reasons have been given for the admiral's action in asking for detachment, and indicating his intention to apply for retirement under the forty-years' service law, but it will be found in the end that he was sorely disappointed in his squadron being broken up, by



REAR ADMIRAL RICHARD W. MEADE.

orders of the department taking from him his flagship New York, to participate in the naval display at Kiel next month, and by other changes in the fleet that were displeasing to him. Admiral Meade had figured on doing big things with his squadron this summer. Nothing indicates this more than the bold position taken by him at the meeting of naval architects in New York a short time ago, when he opposed the policy of the department in building ships like the Minneapolis and Columbia, and declared that they were experiments. His troubles date from that meeting. Proceedings of the New York meeting have just come to hand, and it is interesting to note how Admiral Meade's plans, there outlined, have been badly shattered by changes made in his ships. He created a sensation at the New York gathering by declaring that he would first carry out his own plans with the north Atlantic squadron and report to the powers at Washington afterwards, but he probably found the task a difficult one, although he is among the greatest of American naval officers.

"I am an admiral now," he said to the naval constructors, engineers and others assembled in New York, "and I do not see why a man, these days, when he reaches the rank to which he has been looking forward all his life, should not be admiral in fact. I have commanded ships of all classes, from the 'ninety-day' gunboats up to some very large vessels. I have always contended that all regulations are made for fools, not for wise men. They are made for people who do not know, not for people who do know, and I have made up my mind, if I get my squadron together, that I am going to have some full-speed trials and report the results afterwards. When I commanded the Vandalia, I did not ask the department for a trial, but I had it and I got a very good result. I got 12.7 knots out of that wooden ship, but the bureau found fault with me, I believe, for burning so much coal. I repeated the trial and was found fault with again, but I had the experiments. I propose, if I am not hampered, to test this Columbia business *au fond*, as the French say—to go to the bottom of it. But I think that the authorities of the navy department ought not to hold up our hands; when they find a captain or an admiral who is innocently transgressing the blue-book in the desire to serve his country, that they ought to help him out. I think that in regard to this matter we sailors in the navy can help the naval constructors and engineers a good deal, and I propose to help them. I propose that the engineer-in-chief shall get all the data possible, and Mr. Cramp shall derive all the information that I have it within my power to afford him. I am here in this society to help my colleagues to build ships and engine them, to help them to get the best results, and while I am in that position, if God

gives me health to do it, I propose to give you the best possible results in my power in the course of the next year or two.

"As I say, the building of ships like the Minneapolis and Columbia is an experiment, and the experiment will not be completed until I try my own. I propose to have the Columbia, with her hull in perfect condition, with her coal as good as I can get it, lying in the harbor here waiting for the Teutonic or Majestic to come out, and then I propose to signal orders to the commanding officer to overtake that vessel, and if he succeeds I shall be the first to congratulate my friend, the engineer-in-chief, on his success."

This sentiment from Admiral Meade, briefly referred to at the time of the New York meeting, was then partly looked upon as a show of speech in a big gathering, but it stirred up a great deal of feeling in Washington and undoubtedly bears important relation to the present crisis in the admiral's affairs.

Coal Consumption of Fast Torpedo Boat Chasers.

Engineers will be interested in particulars of the coal consumption of some of the fast torpedo boat chasers that are being built in great numbers by the British government. One of these vessels, built by Messrs. Thornycroft, on a three hours' run maintained a speed of 27.97 knots, practically 28 knots, or for the whole time 84 nautical miles; and while running this distance burned under three water tube boilers 17 1/4 tons of coal. The rate of combustion is 68 pounds of coal per square foot of grate area per hour, although in some trials it has reached 79 pounds; but then the power per square foot of grate area is very high, 24 I. H. P. The boats of this class carry sixty tons of fuel at a pinch, and this would enable them to go at full speed for a period of over nine hours, during which they would travel fully 250 nautical miles. A ton of coal takes a boat of this class five miles at the speed noted. But it would only be on a rush that such speed would be maintained. Other tests have been made at about half the speed—13 knots—and here, instead of five miles, the ton of coal carried the destroyer a distance of about 38 nautical miles, so that the total distance at 13 knots with the sixty tons of coal would be nearly 2,000 miles. This shows the great cost of doubling the speed. The coal per horse power at 13 knots was 1.61 pounds.

Around the Lakes.

Cleveland's two harbor tug companies have made arrangements to have their tugs take turns at the piers, so that there will be no more long chases after tows.

It is again said at Sault Ste. Marie that the Canadian canal will not be in readiness for the passage of vessels until late in the season, and that a few boats may yet pass through the new United States lock before the Canadian waterway is entirely completed.

It is unofficially announced that Postmaster General Wilson has issued an order establishing a service for delivery and collection of the mail matter of vessels passing Detroit. It is the intention to use a steam launch on the river, and to have men constantly in charge, but the details have not as yet been fully arranged.

Capt. Harvey J. Hatch of Chicago, who was lost with all hands in the schooner Kate Kelley on Lake Michigan during the storm of the past week, was among the oldest of lake navigators, and had made a number of salt water voyages from the lakes. He was vice president of the Chicago lodge, Ship Masters' association.

New lake vessels, all steamers, listed in the office of the bureau of navigation during the past week are: Norseman, Port Huron, Mich., 660.01 tons gross, 501.81 net, No. 130,689; Pine Lake, Grand Haven, Mich., 388.10 tons gross, 274.31 net, No. 150,695; Hazel, Marquette, Mich., 11.48 tons gross, 7.18 net, No. 96,293.

F. W. Wheeler & Co. of West Bay City launched on Saturday last the wooden steamer Stephenson, a lumber carrier of about 500 net registered tons. One of the two oil barges being built by the American Steel Barge Co. for the Standard company was also launched Saturday. Her capacity is about 400,000 gallons. The second boat is not yet ready for launching. These barges will each spread about 9,000 feet of canvas, but will probably be towed most of the time while in lake service.

Now that the new American liner St. Louis is about ready for trial, it is again reported that negotiations are under way for the construction of two more ships. Of course it would not be surprising if something of this sort is really on foot. The trial of the St. Louis will probably take place off the New England coast. She will first go to Newport News to be docked.

A COPY OF THE PHOTO-GRAVURE SUPPLEMENT OF DIRECTORS OF THE LAKE CARRIERS' ASSOCIATION, TOGETHER WITH THE LARGE ENGRAVING OF THE STEAMER NORTH WEST, BOTH OF WHICH WERE CONTAINED IN RECENT BIG ISSUES OF THE REVIEW, WILL BE MAILED IN A PASTEBOARD TUBE TO ANY ADDRESS UPON RECEIPT OF 50 CENTS IN STAMPS.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
Total.....	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1890.....	Number.	Net Tonnage.
" " 1891.....	218	108,515.00
" " 1892.....	204	111,856.45
" " 1893.....	169	45,168.98
" " 1894.....	175	99,271.24
Total.....	872	406,976.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.
(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

INSPECTOR MEAD of the light-house service intimates that recent heavy losses from stranding in Hay lake channel, St. Mary's river, were due to masters running the channel without a full knowledge of its currents. He says that vessel masters have also tried to make the passage when it was too dark to see the buoys. Although the vessel interests are not at all inclined to blame Commander Mead for past delays of the light-house service in preparations for marking and lighting this channel, they will not agree with him entirely as to the cause of the late accidents, especially as there has been no trouble since temporary buoys have been placed where permanent light structures and day marks should have been in position long ago. Another matter to which attention is directed by these accidents is that of proper care for Sault river buoys. Attention is called to this subject in a communication elsewhere in this issue. The light-house board should make a liberal allowance for this work, when the contract is again to be let, and provide regulations regarding it that will insure bids from responsible contractors.

OFFICERS of the immigration bureau are again giving special attention to violations of the alien labor laws on the lakes. They are acting on complaints that Canadians are employed on American vessels. Owners and masters understand, of course, that they are prohibited by United States laws from employing aliens as officers in any capacity on their vessels. They are also prohibited by the contract labor law from soliciting by letter or otherwise the services of a foreigner in any capacity whatever. There is no law, however, to prevent the employment of foreigners in places aboard vessels other than those of an officer, when application is made within the United States. This matter is stirred up at present largely through complaints that the Detroit & Cleveland Steam Navigation Company has been employing aliens in official positions aboard its steamers.

NOW IT is our Canadian neighbors who are worried over the effect of the Chicago drainage canal on lake levels. In the house of commons, a few days ago, Mr. Cockburn, a member from Toronto, sought information from the public works department as to the probable effect of the canal on the waters of the lakes, and Mr. Haggart, minister of public

works, replied that he had directed that an inquiry be made in the matter. It is probable that the Canadian authorities will simply consult the chief of engineers of the United States war department, who has appointed a commission of engineers, of which Gen. Poe of Detroit is the senior officer, to investigate the subject.

A FRACTION less than a mill per ton per mile is now the cost of carrying freight on the lakes. To be exact, a report prepared under the direction of Gen. Poe of the war department, and published elsewhere in this issue, shows that last year the cost per ton per mile of moving 13,195,860 tons of freight to and from Lake Superior was $\frac{99}{100}$ of a mill. In 1893 it was $1\frac{1}{10}$ mills. Every year the cost of lake transportation is lowered. This year the reduction will not be important, as there is a little improvement over the very low freights of 1894, but the increase in capacity of vessels that will come with a 20-foot channel will undoubtedly result in marked reductions later on.

AS SHOWING the esteem in which the latest of our vessels of war are held by foreign powers, it is reported from Washington that the naval attache of the German embassy requested in behalf of his emperor that the armored cruiser New York be sent to represent the United States government at the Kiel naval demonstration next month. The New York and Columbia will fittingly represent the new United States navy at the demonstration.

Deplorable Accident to Unique's Boilers.

Readers of the REVIEW who are acquainted with the efforts of Mr. C. McElroy, of St. Clair, and his associates, to establish, with the steamer Unique, a fast passenger service on the rivers between Detroit and Port Huron, certainly have nothing but sympathy for both owners and builders of the boat in the accidents that have befallen her. The loss of life aboard the boat on Monday last is especially deplorable. From a reliable source, the REVIEW received this account of the accident:

It is well known of course, that the Unique was recently fitted with Babcock & Wilcox water tube boilers and has quadruple expansion engines. She left Detroit at 4 p. m. Monday on her regular trip, and when about two miles above the light-ship in Lake St. Clair a 3-inch water tube on the port side of the furnace in the forward boiler, burst. One fireman was in the bunker passing coal, and was probably killed instantly; another was passing into the engine room at the time, and was so badly scalded that death resulted later. The chief engineer, T. M. Robinson, was on deck at the time, standing at the forward gangway on the port side, and probably from the concussion, lost his balance and fell overboard, and was drowned. His death is the saddest feature of the whole history of the boat. He was a fine fellow, beloved by all who knew him. He was six years in the Majestic, and was among the best engineers on the lakes. Engines and boilers had both been doing good work in the Unique, and the boat was beginning to realize a profitable business. The boilers had proven themselves capable of doing what was claimed for them, but with all the care that was evidently used in their construction this defective tube escaped detection.

In General.

The contract with the Columbian Iron Works of Baltimore for the three new torpedo boats calls for their delivery within fifteen months.

William A. Fairburn of Bath, Me., has an article in the May number of the Engineering Magazine on "The Great Steamers of Long Island Sound."

May furnace reports show a slight decline in pig iron production, but it is thought to be due to labor disturbances, which will probably be temporary in their effect.

The yacht Defender will carry far more canvas than any boat as yet designed. Her total sail area under New York yacht club rules will be about 13,000 square feet, as against 11,300 square feet on the Vigilant.

Chief Engineer Martin of La Gascogne, the French steamer which was brought safely into New York last winter after a serious accident to her machinery, and after they had given her up as lost, has been created a knight of the Legion of Honor by President Faure of France.

As had been expected, Col. Wm. P. Craighill, No. 3 on the list in the engineer corps, has been appointed to succeed Gen. Casey as chief of engineers. Col. Geo. H. Mendell and Col. Henry L. Abbott, both of whom are Col. Craighill's seniors, retire in a few months, and this was undoubtedly a bar to the promotion of either of them.

A twin-screw steel passenger steamer, to cost about \$600,000, will be built by the Newport News Ship Building and Dry Dock Company, for the Plant Line, having offices at 261 Broadway, New York, and operating ships on Gulf of Mexico routes, as well as along the Atlantic coast, and between Boston and Halifax. The new boat will be 400 feet long, 47 feet beam and 37 feet 6 inches depth and of about 5,000 tons gross. She is to have quadruple expansion engines and a guaranteed speed of 17 knots.

Care of Sault River Buoys.

Editor MARINE REVIEW:—I note in several of the daily papers a telegram announcing the loss to different vessels of about \$25,000, owing to the absence of buoys in the St. Mary's river—buoys which should have been in position presumably, had there been no negligence on the part of those having them in charge. During several years past I have been connected with works of improvement at Sault Ste. Marie and I know that these accidents that invariably followed the letting of contracts for the caring of buoys at prices so low that the only bidders to be found are those who have not the necessary capital and equipment or willingness to expend money in giving to the buoys the attention that is essential to their successful maintenance in proper position. This is no fault of the naval officer in charge of the district. It is the fault of the system that awards the contract to the lowest bidder under specifications that are not sufficiently rigid to exclude a class of bidders who can take the contracts at low prices and by neglecting the work make money at prices which prohibit the competition of men who have proper tugs to do the work, and who would be glad to tender with a view of efficiently maintaining the buoys if the specifications were such as to exclude the class of bidders referred to. Two simple methods, if enforced, would probably prevent such losses as have recently occurred in the "Soo" river. The first and best is to maintain a patrol system; the next would be to require the contractor to own a tug suitable for the work to warrant his bid being accepted, and to require that he shall continuously have a proper steam craft at his disposal during the pendency of his contract. The contract is again soon to be awarded under the old system, which has proven a great disadvantage to the shipping interests. An expenditure slightly in excess of that now made by the government for this work would do away entirely with the complaint of misplaced buoys.

J. A. M.

DETROIT, MICH., May 9, 1894.

Gas Buoys for Erie, Poverty Passage and Lansing Shoal.

Secretary Keep of the Lake Carriers' Association is informed that the light-house board has ordered six gas buoys for the lakes. Two have been completed and sent to Commander Gridley of Buffalo, inspector for the tenth district. With these Commander Gridley will establish a gas buoy at the turning point at the entrance to Erie harbor. One of these buoys will be used to relieve the other. The other four buoys are now being constructed. When received, two of them will be placed on Gravelly island in Poverty passage, and Lansing shoal, Lake Michigan. The other two will be held in reserve to relieve these when being charged.

Trade Notes.

Do you want a marine boiler? Wildman Brothers, 87 to 93 N. Clinton street, Chicago, Ill., are the people to call on, as they can save you money, and build perfect boilers.

There are five old-established ship chandlery concerns on the lakes, and H. H. Baker & Co. Buffalo, is one of them, and probably the oldest. Their exclusively marine business is very large. The ability with which the affairs of this house are carried on is evidenced by the fact that Mr. Baker was made postmaster last fall.

Another stockless anchor of the type which is coming into general use, has been put on the market by the American Ship Windlass Co., Providence, R. I. It is made in sizes from $5\frac{1}{2}$ pounds at \$1.25, to the largest required. Its advantages can best be seen from a working model which will be mailed free to owners or captains making requests for it.

Gross earnings of the General Electric Company for the calendar year 1894 were \$13,236,611; operating expenses, \$11,451,864; net profits, \$1,811,747, against \$3,189,884 the preceding year; balance \$1,347,164; depreciation \$933,521; surplus, \$413,643. This declares 7 per cent. dividend on the preferred stock, or \$297,640 per annum, leaving for the common stock in the year 3.44 per cent.

A most novel device for keeping boilers clean is the electrical water purifier, manufactured by the E. W. P. Co., 186 Waverly avenue, Cleveland. It consists of an electrical battery, the feed water passing through connecting the positive and negative plates, thus depriving the carbonates of their solvent. It is in successful operation on several stationary plants, and J. H. Gillmore, the agent, will be pleased to explain its benefits for marine boilers.

Water-proof and fire-proof properties of Superior graphite paint make it especially suitable for tops of deck-houses, boat-covers and wherever canvas is used for covering. Its rust preventive properties recommend it for water bottoms of steel vessels, while its price considering the amount of space it will cover as compared with other paints, does not prevent its being used even on the hulls of vessels. Actual evidence of all its properties will be found in a circular that will be mailed to any one interested, by the Detroit Graphite Mfg. Co. of Detroit, Mich.

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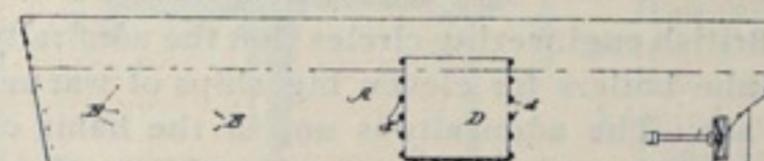
Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

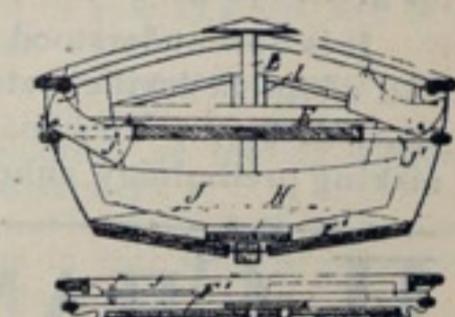
538,749. Collapsible Boat. Theophilus O. Smith, Medley, and Horace Fuller, St. Aubin, Isle of Jersey, England. Filed Feb. 8, 1894. Serial No. 499,560. Patented in France Feb. 16, 1894. No. 234,315; in England Apr. 17, 1894, No. 2,264, and in Germany Nov. 8, 1894. No. 77,821.

Claim. A collapsible boat, comprising a complete shell of canvas, a gunwale fixed to the upper edges of the canvas a plank bottom, vertical stretchers or supports holding the frame work open, stringers fixed on the sides of the canvas, and seats carried by the said stringers, the framework and seats adapted to collapse vertically without folding and lie flat on the bottom of the boat.

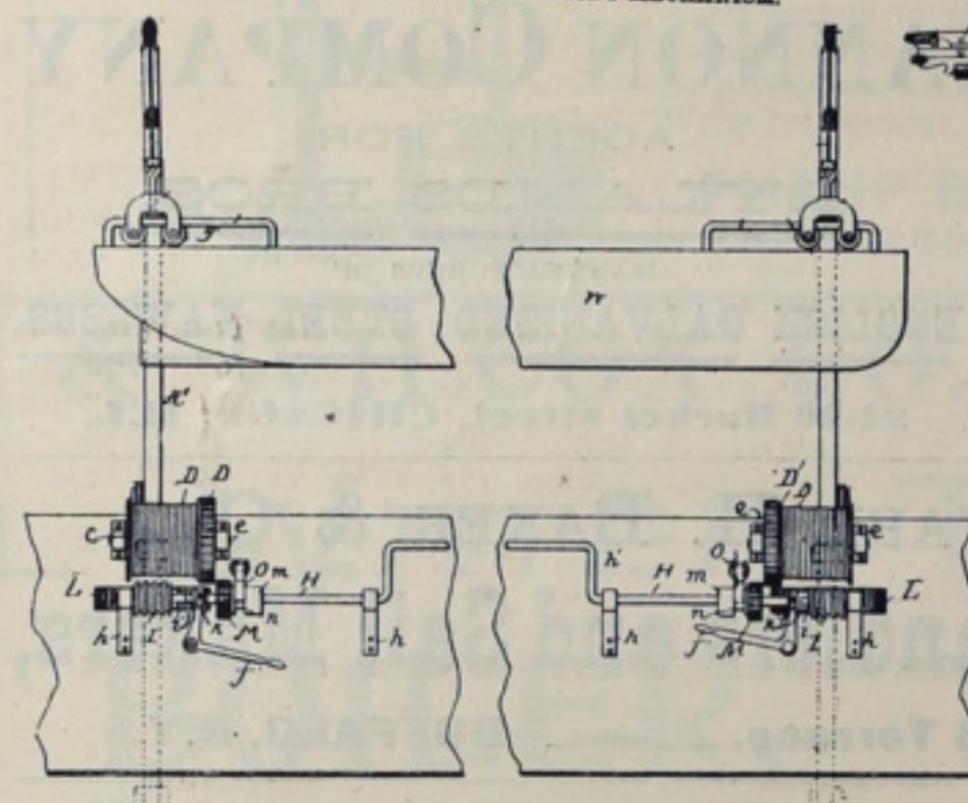
538,780. CAISSON FOR SHIPS.



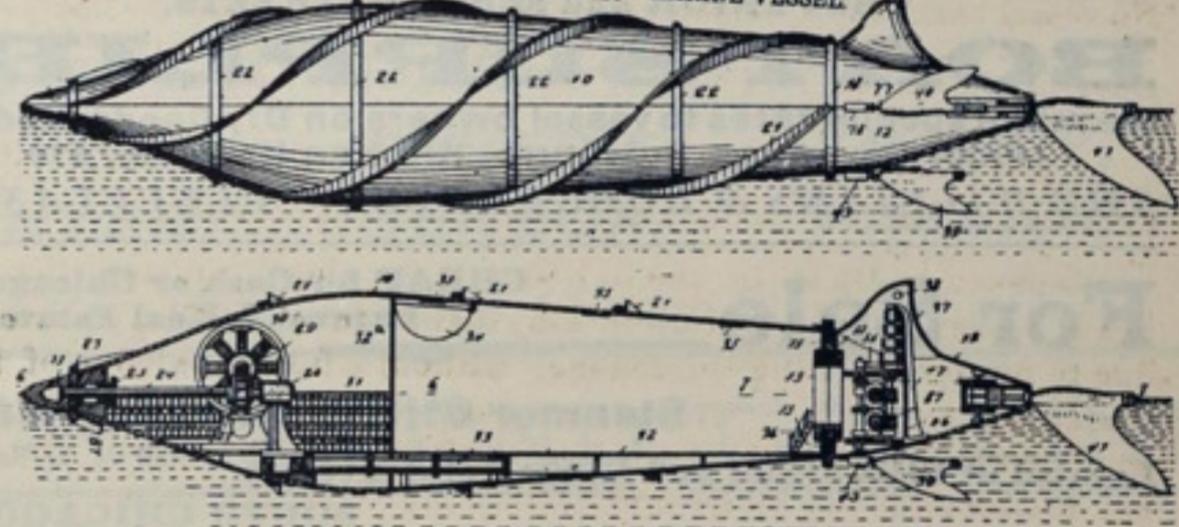
538,749. COLLAPSIBLE BOAT



539,008. BOAT-DAVIT-OPERATING MECHANISM.



538,921. MARINE VESSEL.



538,780. Caisson for Ships. Costello N. Holford, Washington, D. C. Filed July 7, 1894. Serial No. 516,873.

Claim. The combination with the hull having a series of vertically arranged bolts, and the propeller shaft section disposed on the outside of the hull, of ribs adapted to be secured to such bolts having slots or cut away portions whereby they are adapted to fit over the shaft, cut off devices held to operate over the said slot, and arranged to be held closed by the outside water pressure and a cap plate or housing adapted to be detachably connected to the ribs all arranged.

538,921. Marine Vessel. Sebastien Lacavalerie, Caracas, Venezuela. Filed Oct. 2, 1894. Serial No. 524,764.

Claim. The combination of the hull and the end portion having in-turned flanges provided with curved ribs in their opposing faces, the propeller ring held to rotate between the said flanges and provided with recesses to engage the said ribs, means for fastening the flanges together, and the propeller secured to the said ring and encircling the hull.

539,008. Boat-davit Operating Mechanism. James W. McKinnon, New York, N. Y. Filed Nov. 17, 1894. Serial No. 529,206.

Claim. The combination of rotatable davits adapted to carry boat tackle, gears on said davits, a shaft carrying worms adapted to mesh with said gears, clutches for said worms on said shaft, whereby each of said davits may be independently operated, a winding drum for the tackle and gearing connecting said winding drum with said shaft.

Nine more torpedo boat chasers recently ordered by the British admiralty are to develop thirty knots on trial.

Miscellaneous Matters.

Eighty cars of coal were dumped into the hold of the steamer *Mari-tana* in Ashtabula, a few days ago, in five hours with the McMyler car dumping machine.

It is expected that the Northern line passenger steamer *North Land*, now nearing completion at the ship yard of the *Globe Iron Works Company*, will be in readiness for a run into the lake on Tuesday next.

The Buckeye Bell Foundry of Cincinnati is manufacturing and selling to ship chandlers on the lakes bells that meet all requirements laid down by the steamboat inspectors. The *Upson-Walton Co.* is handling these bells in Cleveland.

It is expected that Rear Admiral Ramsey, chief of the bureau of navigation, navy department, will succeed Admiral Meade in command of the north Atlantic squadron, and that Commander Robley D. Evans will be given charge of the navigation bureau.

It is now understood in British engineering circles that the admiralty will adopt Belleville water tube boilers for eleven big ships of war authorized by the latest naval act. The admiralty is not in the habit of making preliminary announcements, and there is as yet nothing official

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in the matter, but if such a course is undertaken the storm of opposition that has already attended the application of the French boilers to two British ships will be as nothing to the protests that will follow.

Four of the composite gunboats authorized by the last congress will be of the single screw type, and will be supplied with full sail power. The remaining two will be twin screw vessels without sail. This is the decision of Secretary Herbert, and in accordance with it, the bureau of construction and repair is now working on the plans for both types of vessels. These vessels will be of about 700 maximum horse power, giving a probable speed of 11 to 11½ knots under most favorable conditions. Bids for their construction will be solicited in about a month.

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THREE BOOKS OF SAILING DIRECTIONS, ONE COVERING LAKE SUPERIOR AND THE ST. MARY'S RIVER ANOTHER COVERING LAKE MICHIGAN AND THE STRAITS OF MACKINAC, AND A THIRD TAKING IN LAKES HURON AND ST. CLAIR WITH DETROIT AND ST. CLAIR RIVERS, ARE NOW OFFERED FOR SALE BY THE HYDROGRAPHIC OFFICE. THESE BOOKS ARE PARTS OF A WORK THAT WILL COVER THE ENTIRE CHAIN OF LAKES. THEY CONTAIN CHARTS OF LEADING CHANNELS AND HARBORS, AND MAY BE HAD FROM THE MARINE REVIEW, 516 PERRY PAYNE BUILDING, CLEVELAND, AT \$1 EACH.

U. S. ENGINEER OFFICE, 34 WEST CONGRESS ST., DETROIT, MICH., MAY 8, 1895. Sealed proposals for furnishing all labor, materials and appliances, and removing material from moveable dam and from 800-foot lock approaches, also for constructing piers for lock approaches, will be received here until 2 P. M., JUNE 7, 1895, and then publicly opened. All information furnished on application. O. M. POE, Col., Engrs.

TREASURY DEPARTMENT, OFFICE OF General Superintendent U. S. Life-Saving Service, Washington, D. C., May 4, 1895. Sealed proposals will be received at this office until 2 o'clock P. M. of Friday, the 31st day of May, 1895, for furnishing supplies required for use of the Life-Saving Service for the fiscal year ending June 30, 1896; the supplies to be delivered at such points in New York City, Grand Haven, Mich., and San Francisco, Cal., as may be required, and in the quantities named in the specifications. The supplies needed consist of beds and bedding, blocks and sheaves, cordage, crockery, furniture, hardware, lamps, lanterns, etc.; lumber, medicines, etc.; paints, oils, etc.; shipchandlery, stoves, etc.; tools, and miscellaneous articles, all of which are enumerated in the specifications attached to the forms of bid, etc., which may be obtained upon application to this office, or to the Inspector of Life-Saving Stations, 24 State street, New York City; Superintendent Eleventh Life-Saving District—Grand Haven, Mich.; and Superintendent Twelfth Life-Saving District, Appraisers' New Building, San Francisco, Cal. Envelopes containing proposals to be addressed to the "General Superintendent U. S. Life-Saving Service, Washington, D. C." and marked on the outside, "Proposal for Annual Supplies." The right is reserved to reject any or all bids, and to waive defects, if deemed for the interests of the Government. S. I. KIMBALL, General Superintendent.

May 23

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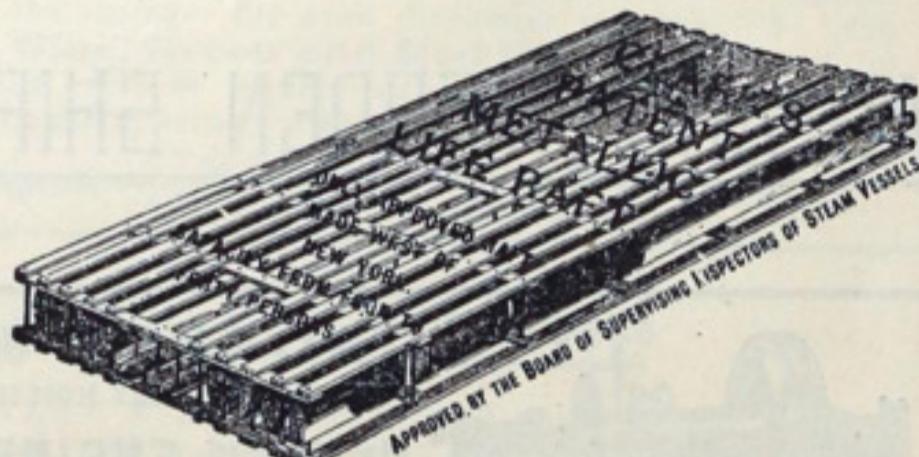
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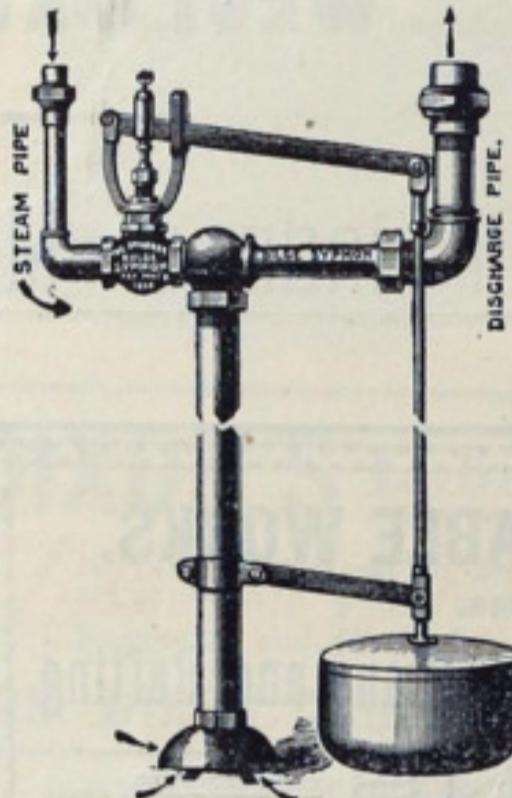


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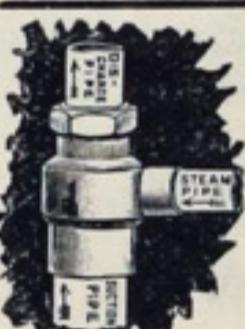
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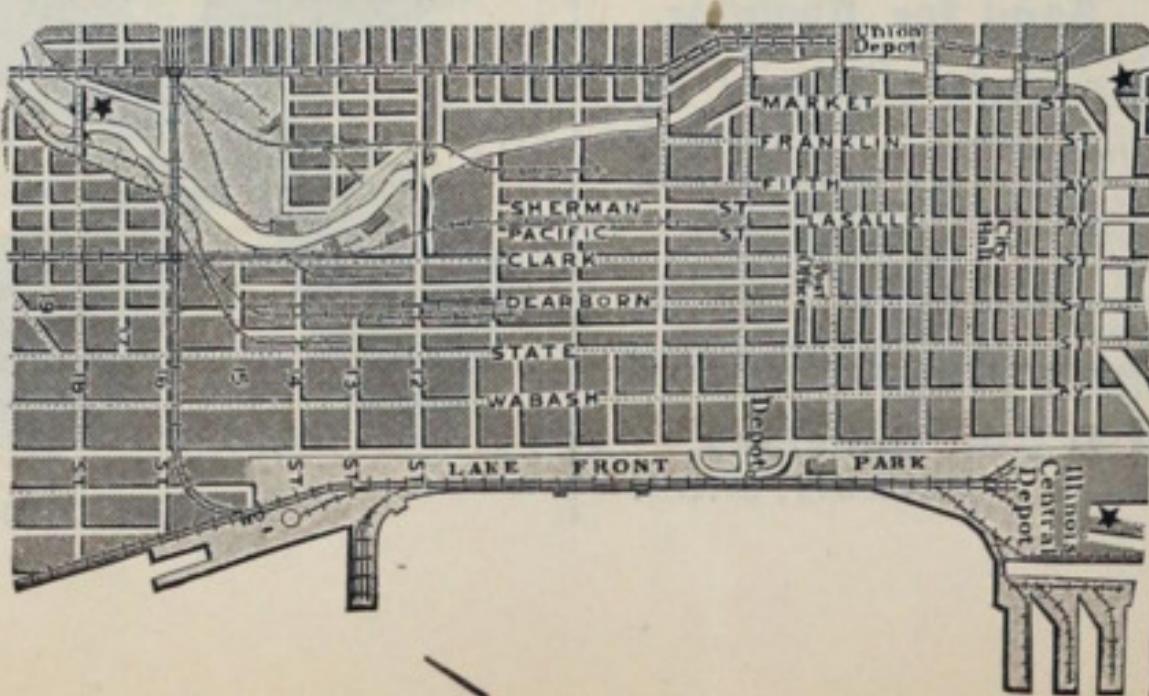
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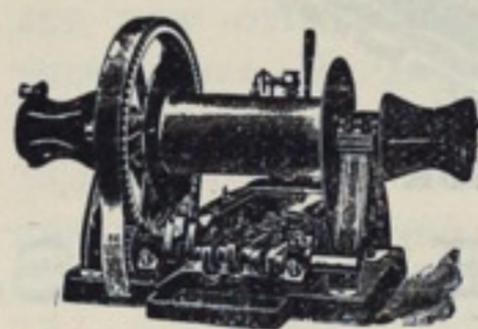
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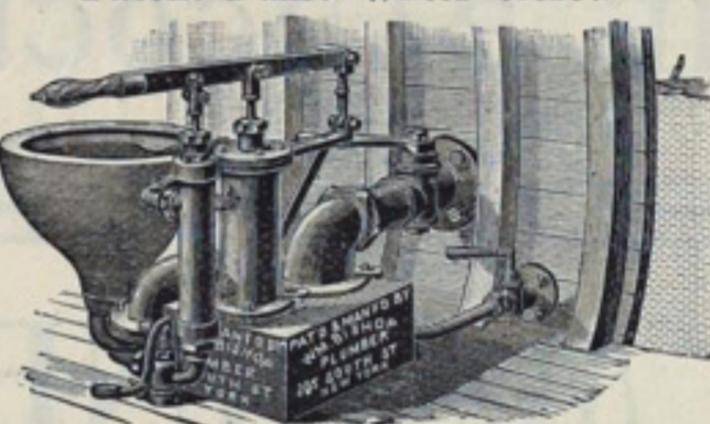
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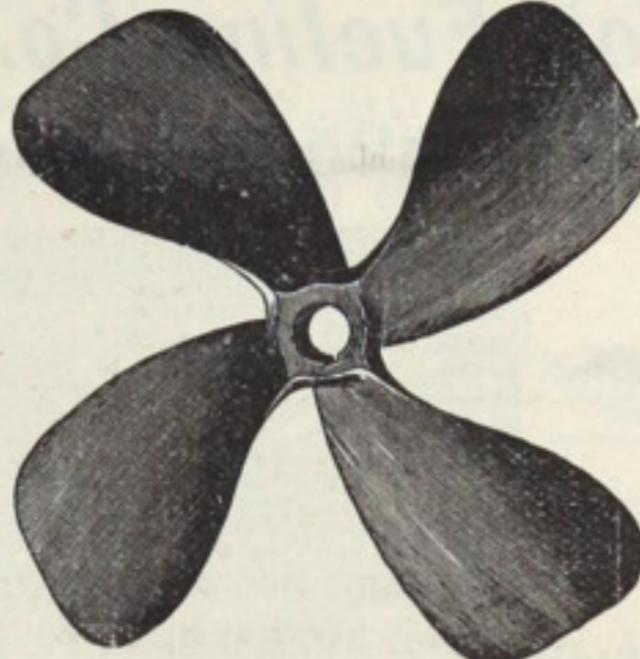
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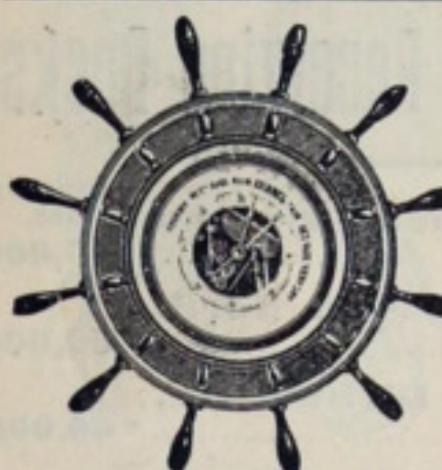
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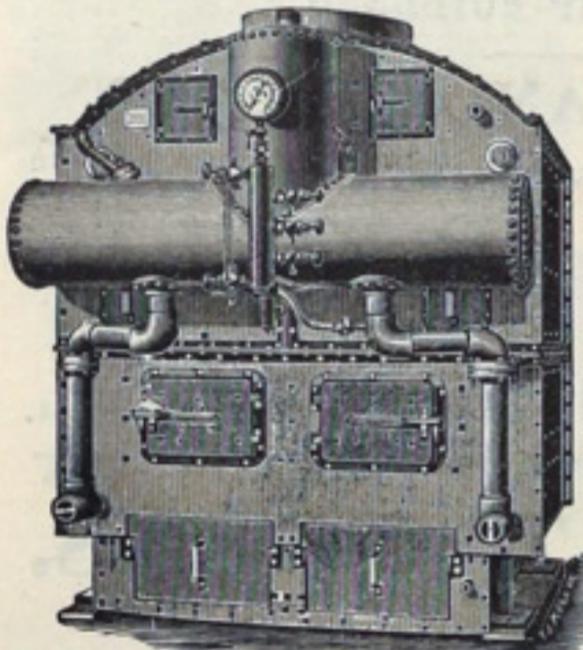
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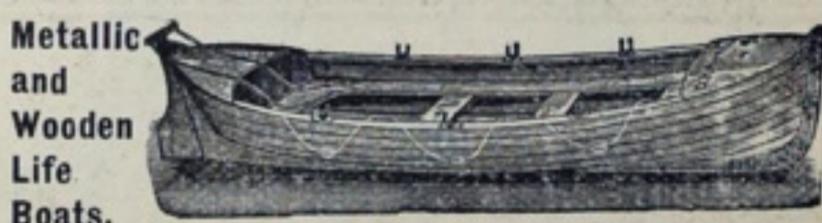
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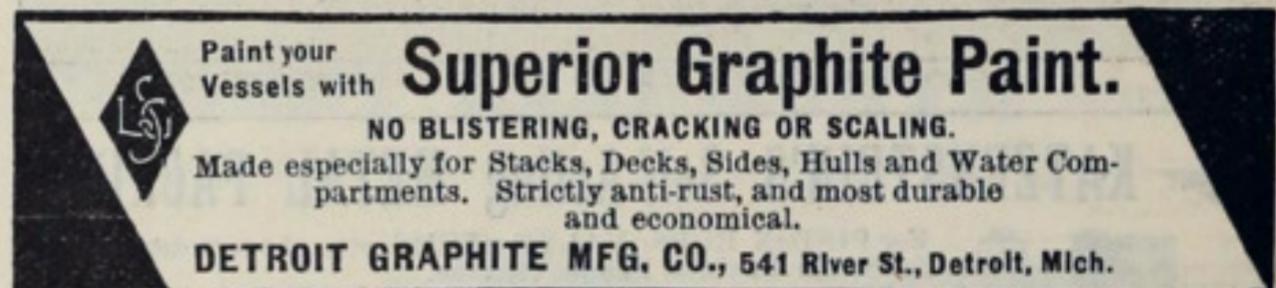
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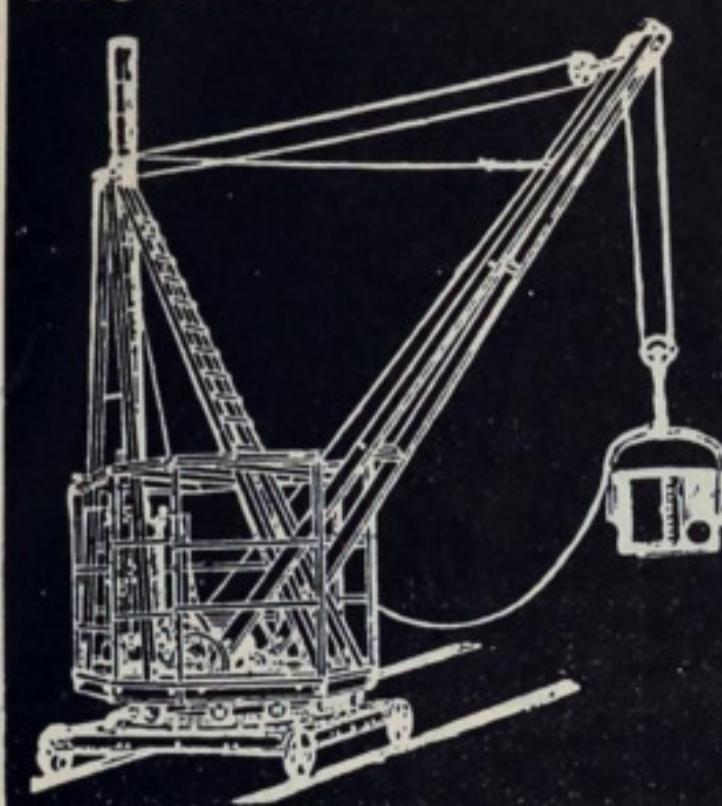
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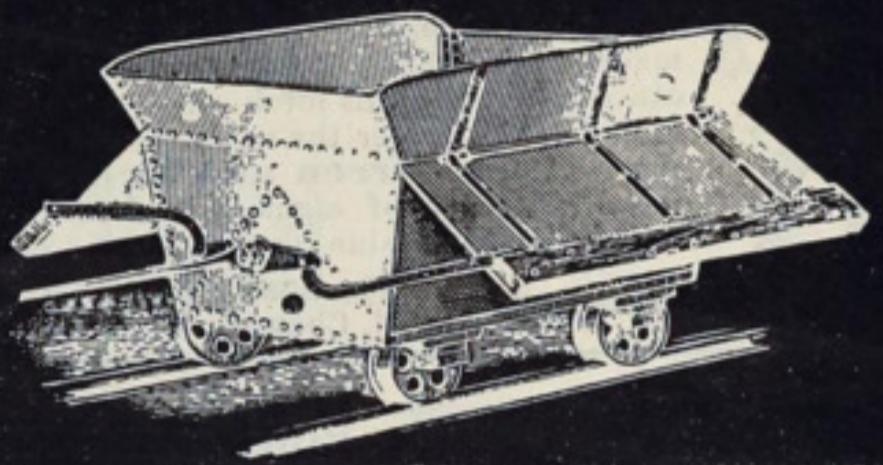


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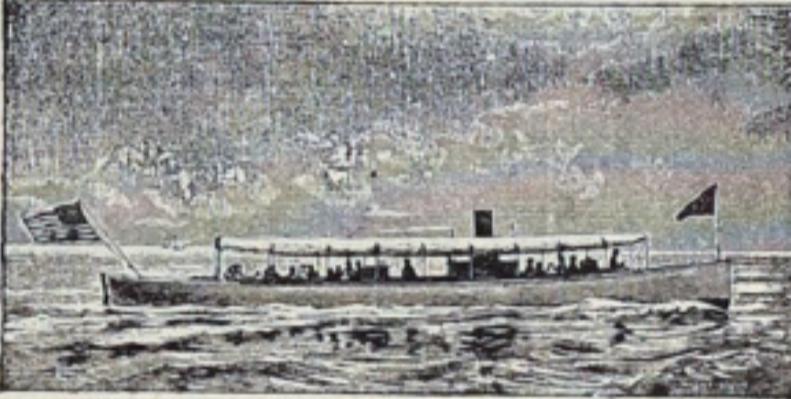
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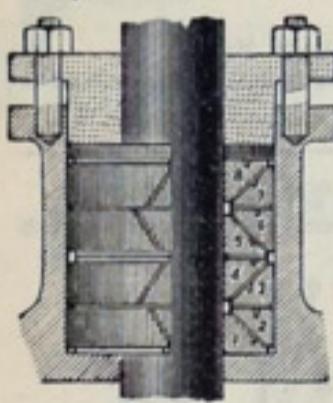
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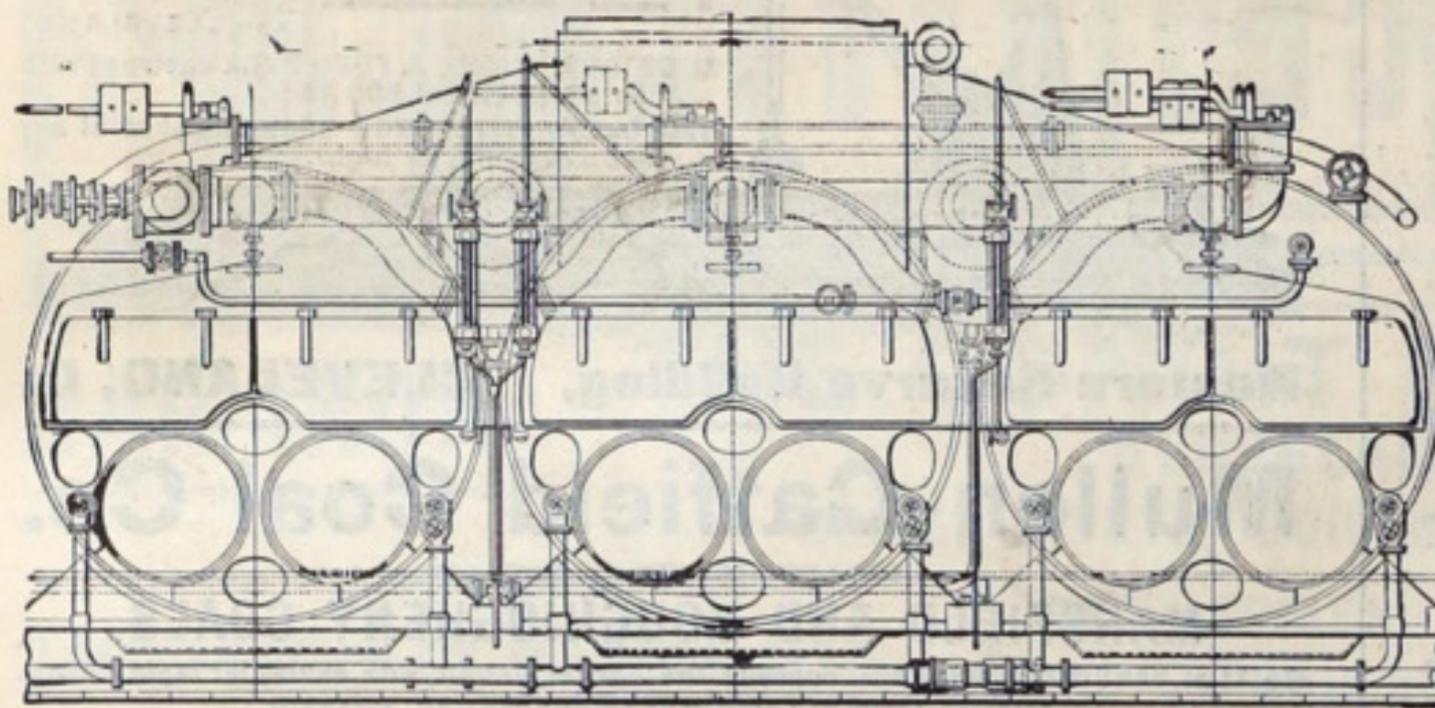
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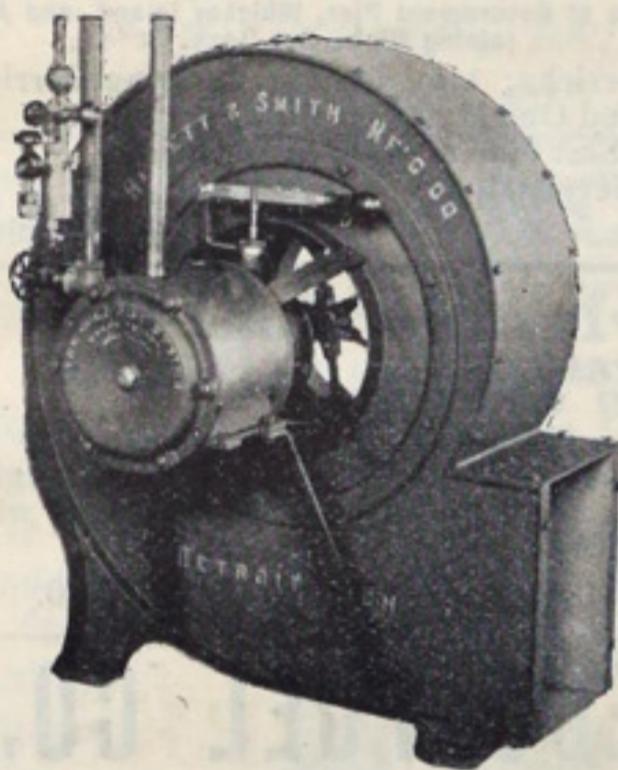
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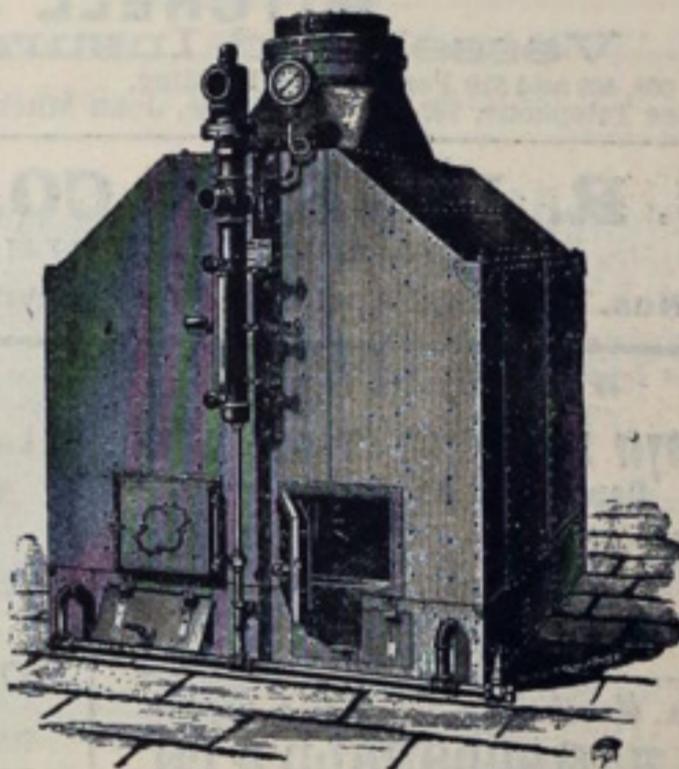
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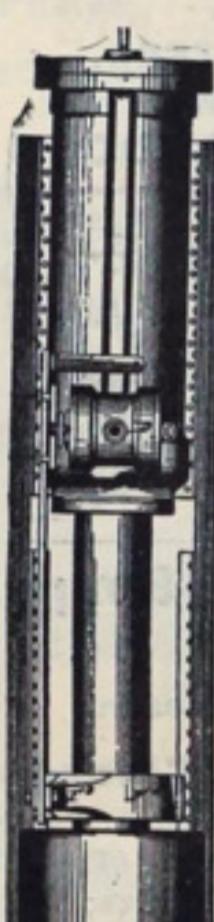
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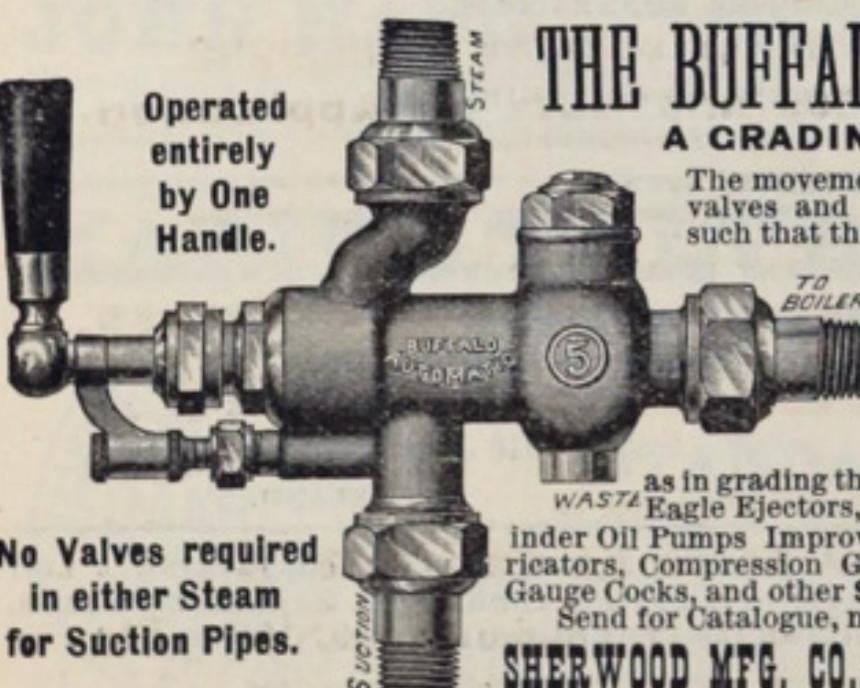
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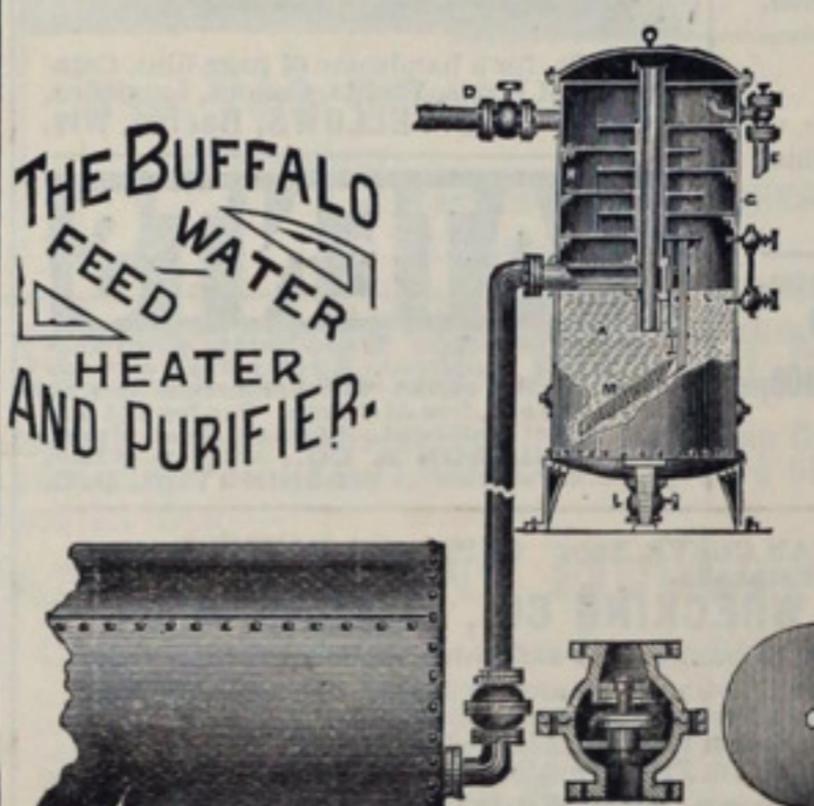
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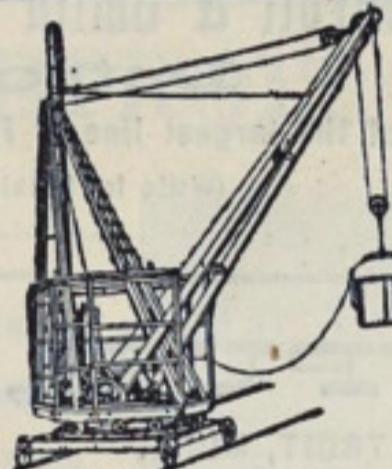
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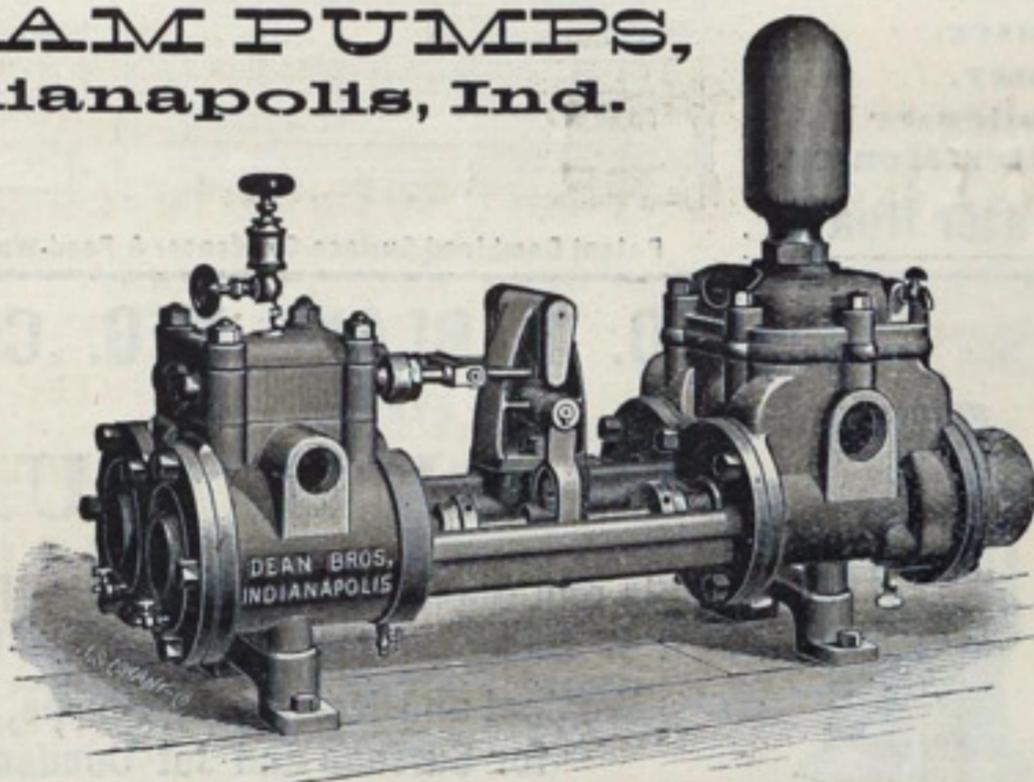
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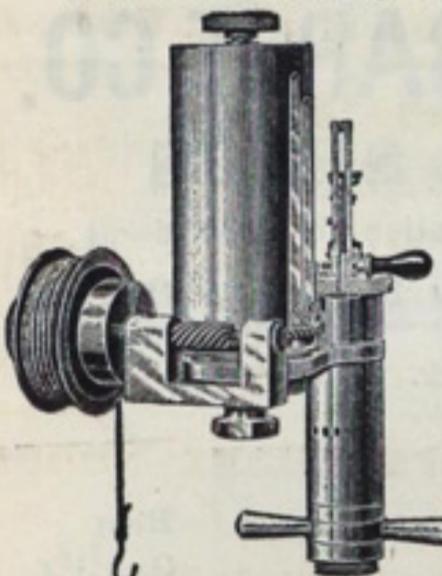
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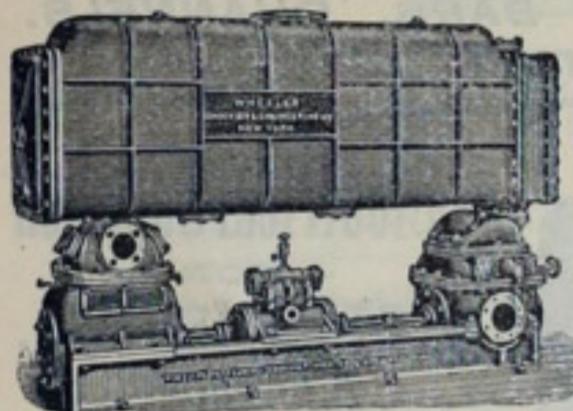
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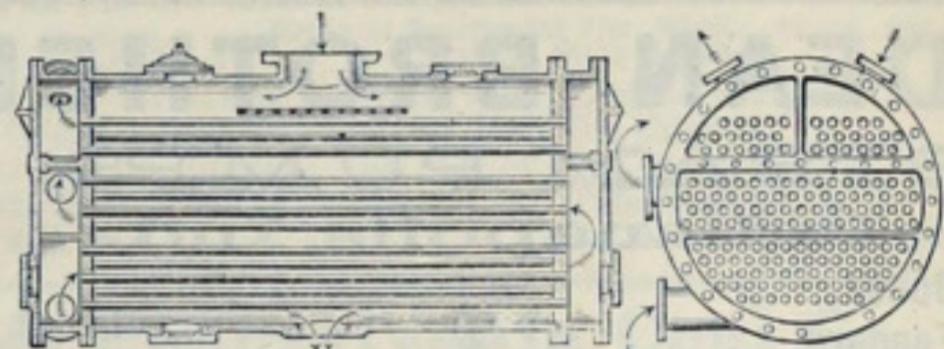
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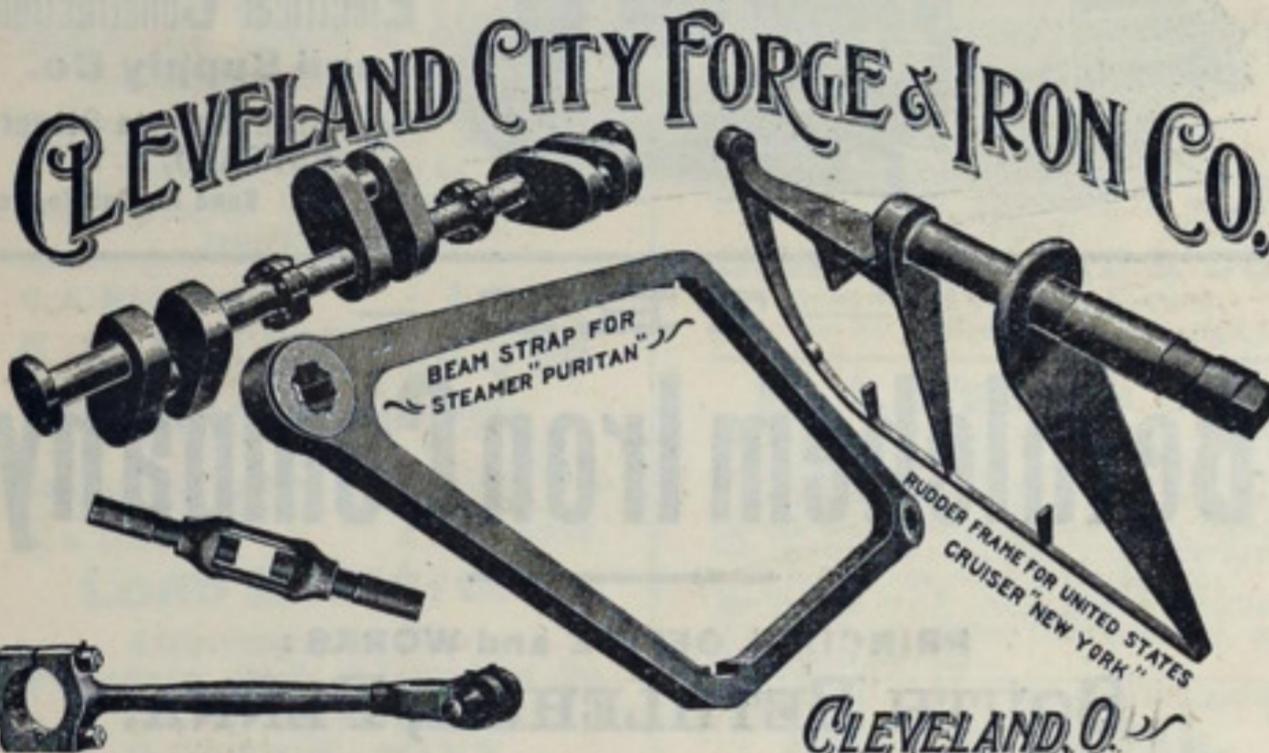
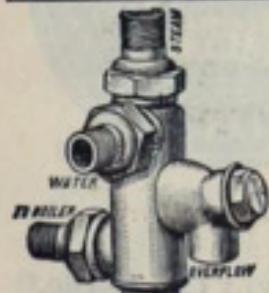
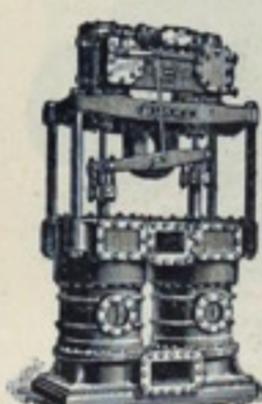
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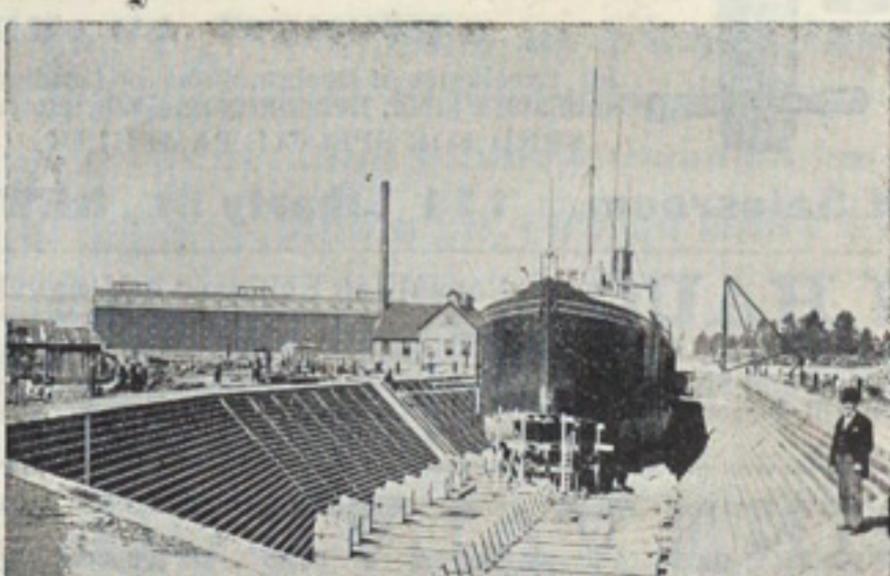
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